

projecting stem tip and a meristematic region that later develops such a tip are of the same ontogenetic significance, and therefore that a cotyledonary ring may be lateral even if the stem tip is not organized. The cells that are to organize it later are still apical. It certainly also gives a simpler and more consistent interpretation of the grass embryo than to imagine a cotyledon consisting of such distinct structures as scutellum, epiblast, and coleoptile, distinct in origin as well as in position and appearance. The author disposes of the dicotyledonous embryo of *Agapanthus* as meaning a "progressive" character, from which we are to infer that he still maintains the view that the dicotyledons have been derived from the monocotyledons. We had assumed that this view was no longer under discussion.—J. M. C.

Temperature and viability.—WAGGONER²⁴ finds that the resistance of radish seeds to high temperature is inversely proportional to the initial water content at the time of heating. At effective temperatures the water content fell with duration of heating. Three different varieties studied showed similar resistance. WAGGONER finds that much of the past work on resistance of seeds to high temperatures lacks precision because the operators allowed the water content to vary greatly during heating. They heated in water in open dishes, in the oven, or in dry corked flasks. The water absorbed or given off by radish seeds during heating as determined by the use of one or the other of these methods goes far to determine their resistance to heat. GROVES²⁵ has taken care of this source of error by securing his seeds gas-tight in tubes just large enough to hold the 100 seeds, thus leading to a rapid rise of vapor pressure with heating and an equilibrium between the vapor of the air and the water content without measurable water loss. It is interesting to see that radish seeds can be dried down to 0.4 per cent moisture without injury, for EWART²⁶ has concluded that the sorts of seeds that are most resistant to drying cannot withstand a moisture reduction below 2 or 3 per cent without injury; while *Oxalis*, *Salix*, and *Populus* will not withstand any drying in a desiccator.—WM. CROCKER.

Organic nutrition of plants.—KNUDSON²⁷ has investigated the influence of certain mono- and disaccharides, added to nutrient media, on the growth of various green plants, as corn, peas, radish, vetch, etc. These plants can absorb through the root system and utilize sugars in growth. The order of the sugars with reference to beneficial effects varied with the kind of plant. Thus with corn grown in the light, the order was glucose and fructose, saccharose, maltose;

²⁴ WAGGONER, H. D., The viability of radish seeds (*Raphanus sativus* L.) as effected by high temperatures and water. Amer. Jour. Bot. 4:299-313. fig. 1. 1917.

²⁵ BOT. GAZ. 58:169-189. 1917.

²⁶ Ewart, Proceedings and Trans. of the Liverpool Biol. Soc. 10:185-193. 1896.

²⁷ KNUDSON, LEWIS, Influence of certain carbohydrates on green plants. Cornell Agric. Exp. Sta. Mem. 9:1-75. 1916.